

## Complex 9-A-7660 Kinzhal, missile 9-S-7760 / product 292

DATA FOR 2024 (standard update)

Complex 9-A-7660 "Dagger", missile 9-S-7760 / product 292

★★★★★

Aircraft missile system with an aeroballistic missile. Developed jointly by the Machine-Building Design Bureau (Kolomna, missile, system) and RSK MiG (carrier aircraft). Presumably, work on the creation of the system began in the late 1990s - early 2000s, when the idea arose of combining the capabilities of the MiG-31 as a carrier aircraft and an accelerating stage with an aeroballistic missile. The carrier aircraft is a modified MiG-31BM aircraft - MiG-31K product 06 (tail 06 red, chief designer - Yu. F. Sushkov). As a missile - a missile created on the basis of the 9M723 ballistic missile of the Iskander-M missile system. The development of the missile was started by KBM within the framework of the R&D project "292" no later than 2012.

In terms of its capabilities, the aircraft missile system is designed to destroy important infrastructure facilities - command centers, air defense and missile defense systems, air bases, etc. Including with the use of a nuclear warhead. It is also possible to self-guide the missile and use it, accordingly, against limited-mobility targets such as ship formations, individual ships, clusters of equipment, etc.

The MiG-31K prototype aircraft (product 06) made its first flight under the control of test pilots M.A. Belyaev and S.V. Gorbunov on May 31, 2016. In 2021, MiG-31I carrier aircraft will enter service.

In the speech of the President of Russia on March 1, 2018 with the presentation of the Kinzhal missile system, it was reported that since December 1, 2017, the system began experimental combat duty at one of the airfields of the Southern Military District. Presumably, we are talking about the 929th State Flight Test Center of the Russian Ministry of Defense, where the video shown on March 1, 2018 was filmed. In the spring of 2018, operational tests of the missile system began in the Southern Military District. On December 1, 2021, the formation of the second squadron of aircraft carriers of the system was completed and the 54th Long-Range Aviation Regiment of the Russian Aerospace Forces (Akhtubinsk base) was formed from two squadrons.

Western sources report that the tests of the Kinzhal system were to be fully completed by 2020 and the system was to be officially accepted into service ( [source](#) ).

*Information about the complex without citing sources is of a presumptive and hypothetical nature.*



The MiG-31K carrier aircraft (tail number 93) with the 9-S-7760 Kinzhal missile (video frame from the Russian Ministry of Defense, published on March 10, 2018),

Author: [DIMMI](#)

Created: 10.03.2018 10:29:20

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## X-101 / X-102 - AS-23 KODIAK

DATA FOR 2024 (standard update)

Missile X-101 - AS-23A KODIAK

Missile X-102 - AS-23B KODIAK

★★★★★

A long-range cruise missile. Developed by the Raduga Design Bureau using the experience of creating the Kh-55 cruise missile. The missile has an increased range, is made using radar signature reduction technologies, and is available in two warhead versions: with a conventional warhead (Kh-101) and with a nuclear warhead (Kh-102). According to unconfirmed reports, development of the missile began in 1984 ( [source](#) ), in 1992 according to Jane's and, according to media reports, was completed by 1995.

According to Western sources, testing of the Kh-101 missiles together with the Tu-95MS carrier began in early October 1998 in Akhtubinsk. Some sources also indicate that test launches of the missiles were conducted in 1999 and in April 2000 during exercises of the 37th Air Army of the Russian Long-Range Air Force. Flight tests of the Kh-101 missiles in Akhtubinsk continued in 2002 ( [source](#) ).

The decision to begin serial production of the Kh-101 missiles was made in October 1999. In the fall of 1999, it was also planned to begin re-equipping carrier aircraft like the Tu-95MSM. According to Western data, serial production of the missiles began at the Smolensk plant on December 1, 2002. In our

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opinion, as of 2010, the Kh-101 and Kh-102 missiles have not yet been accepted into service with the Russian Air Force and are probably undergoing tests. Earlier, there was unconfirmed information about the acceptance of the missiles into service in 1999 and in 2002-2003. The name "product 111" is taken from the source Jane's - there are doubts about its reliability.

On March 20, 2012, Russian Defense Minister A. Serdyukov, speaking at an extended meeting of the Defense Ministry Board, announced that the Russian Armed Forces had received a new long-range air-launched cruise missile. The delivery of Kh-101 missiles to the Russian Air Force was expected in 2013 and was probably started in 2013. On November 17, 2015, the first combat use of Kh-101 missiles took place in Syria, the carrier aircraft were Tu-160.

Identification of missile indices - [source](#)



Models of the X-101 cruise missile for Tu-95MS, side No. 317 (red), photo published on 27.09.2012 ( <http://forums.spacebattles.com> , processed).

Author: [DIMMI](#) Created: 12.01.2011 17:45:24 Comments: [94](#) [READ THE FULL ARTICLE >](#)

LMUR / product 305

DATA AS OF 2024 (in progress)  
LMUR / Product 305  
★★★★

Light multipurpose guided missile (LMUR) developed by the Design Bureau of Machine Building (Kolomna). The name "LMUR" first appeared in sources in 2007. The contract for the development of the "Product 305" missile was signed in 2012.

The "Product 305" LMUR missile was initially developed by KBM in the interests of the FSB of Russia to equip special versions of the Mi-8 helicopters (Mi-8MNP-2 and others) of the FSB aviation. The missile was created on the basis of the "Product 79" aircraft missile, which had been developed for a long time for the Russian Ministry of Defense, and was apparently ordered as an analogue of the well-known British Brimstone missile.

Serial production of LMUR missiles was launched for the FSB in 2016, after which the missile began to be purchased for the army aviation helicopters of the Russian Aerospace Forces, and was successfully used by the Aerospace Forces from modified Mi-28N and Ka-52 combat helicopters in combat operations in Syria. In 2020-2021, the LMUR missile is considered as one of the main types of guided weapons of the modernized Mi-28NM and Ka-52M helicopters of the Aerospace Forces, and is also demonstrated at the Army-2021 forum as part of the Ka-52M helicopter armament. At the Army-2021 forum, the missile is exhibited under the index "305E", which indicates that it has also received an export sample passport.

The missile was first demonstrated to the public at the Army-2021 military-technical forum in August 2021. State tests of the missile were completed in 2021. **In September 2022, information appeared in the media about the missile's acceptance into service with the frontline aviation of the Russian Aerospace Forces .** The missile is widely used in the air defense war.

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LMUR missile / "product 305" at the Army-2023 exhibition, August 2023 (photo - Internet).

Author: [DIMMI](#)

Created: 26.06.2019 07:49:12

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## Meteorite. missile 3M25 / X-80 - SS-NX-24 SCORPION / AS-X-19 KOALA / SSC-X-5

**DATA FOR 2013 (standard update)**

**P-750 / 3K25 "Meteorit-M" complex, 3M25 "Thunder" missile - SS-NX-24 SCORPION**

**Meteorit-A complex, 3M25A "Thunder" missile / X-80 / product 255 - AS-X-19 KOALA**

**Meteorit-N complex, 3M25N "Thunder" missile - SSC-X-5 SCORPION**

★★★★

Long-range cruise missile. Developed by OKB-52 (NPO Mashinostroyeniya, Reutov) under General Designer V.N. Chelomey. Preliminary development of the design of a universal supersonic cruise missile in terms of carriers was carried out as part of the Meteorit R&D project since 1973 ( [source](#) ). The USSR Council of Ministers issued a decree on the creation of sea-, air- and land-based cruise missiles (including the Meteorit universal strategic cruise missile) on December 9, 1976. The missile was designed in three basing variants: sea-based (for Project 949M SSGNs), air-based (for the Tu-95 and possibly the Tu-160), and land-based (probably with a self-propelled launcher). The preliminary design of the sea-based complex was approved in December 1978, and the air-based design in January 1979. The development of liquid engines for the booster stage was conducted by the Chemical Automation Design Bureau (KBKhA) from 1977 to 1988. The missiles were manufactured at the Khrunichev Plant. Preliminary tests of the missile for wing extension and cruise engine launch were conducted at the NPO Mashinostroyeniya in Reutovo.

The first launch of the sea-based version of the Meteorit cruise missile from a ground test site at the Kapustin Yar test site took place on May 20, 1980. The missile failed to exit the launcher container and partially destroyed it. The next three launches were also unsuccessful. In the fifth launch on December 16, 1981, the missile successfully launched and flew about 50 km. According to unconfirmed data, in addition to launches from the ground test site, tests were also conducted using the PSK submersible test site in the Black Sea (probably the Balaklava test site). In total, more than 30 3M25 missile launches were conducted from the test sites in 1982-1987. Flight tests of the missile from the K-420 submarine, [project 667M](#) , consisted of three launches - on 27.12.1983, and one launch each in 1984 (06.11.1984) and 1986.

During the tests, the greatest problems were caused by the refinement of the correction systems based on the radio-contrast radar image of the terrain, failures of the plasma formation system of the cruise missile protection system from radar detection, and, in fact, the cruise missile launch process itself - since it was not possible to implement a supersonic launch of the missile's cruise engine, as envisaged by the terms of reference for the missile's creation.

After the missile development program was terminated (1993), about 15 ready-made 3M25 missiles remained at the Khrunichev plant.

*Special thanks to the user "Sluchayny" from the forum <http://militaryrussia.ru> for help in working on the material.*

Aircraft missile 3M25A "Meteorit-A" in the launch configuration (<http://testpilot.ru>)Author: [DIMMI](#)

Created: 11.10.2010 22:59:35

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### X-55 / X-55SM / X-65 / X-555 - AS-15 KENT

**DATA FOR 2023 (standard update)****The Kh-55 / RKV-500A missile / product 120 - AS-15 KENT-A****The Kh-55SM / RKV-500B missile / product 125 - AS-15 KENT-B****The Kh-65E / Kh-65SE****missile The Kh-555 missile - AS-15 KENT-C**

★★★★

Air-launched long-range cruise missile. The design of the missile system with the Kh-55 missile was started by the Resolution of the USSR Council of Ministers dated December 8, 1976 at the Raduga Design Bureau, Chief Designer - I.S.Seleznev.

Earlier, from 1968 to 1970, GosNIIAS conducted the Echo research project, which established that the use of relatively inexpensive long-range subsonic cruise missiles with nuclear warheads, due to stealth and increased accuracy, can be very effective in the conditions of the air defense system of a potential enemy. The enemy's air defense system could be overcome by using cruise missiles in a massive manner with time-series echeloning of the attack. The stealth of such cruise missiles could be achieved by their size, design features, and low-altitude flight with terrain following. In 1971, relying, among other things, on the results of the Echo research and development, the Raduga Design Bureau came up with an initiative to create such a missile, but, mainly citing the low performance characteristics of the proposed missile, the USSR Ministry of Defense refused to create such a missile.

After the intensification of work on the ALCM air-launched cruise missile in the United States in 1975, the USSR Ministry of Defense leadership decided to create a similar missile system. The Resolution of the Council of Ministers of the USSR on the creation of air-based (Kh-55, MKB Raduga), sea-based and land-based cruise missiles was adopted on December 9, 1976. The sea-based and land-based systems were created by NPO Novator ( [3K10 Granat](#) and [3K12 Relief](#) complexes ). In fact, work on designing the missile was started by MKB Raduga back in the summer of 1976. The general designer of MKB Raduga I.S. Seleznev was responsible for the creation of the new weapons system. Deputy Minister I.S. Silaev supervised the project on behalf of the USSR Ministry of Aviation Industry. On behalf of the Military-Industrial Complex under the Council of Ministers of the USSR, control was exercised by the head of the Defense Department of the CPSU Central Committee I.D. Serbin and the Secretary of the CPSU Central Committee for Defense Issues L.P. Ryabov.





The Kh-55SM missile at the Engels airbase, photo no later than 2005 (photo - Leonid Yakutin, <http://vpk-news.ru> ).

Author: [DIMMI](#)

Created: 11/15/2012 11:07:11

Comments: [117](#)

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### Kh-59M / Kh-59MK Ovod-M - AS-18 KAZOO

DATA FOR 2023 (standard update)

Kh-59M "Gadfly-M" / product "D-9M" - AS-18 KAZOO

Kh-59MK / Kh-59MK2

★★★

A heavy tactical guided missile. Developed by the Raduga Design Bureau on the basis of the Kh-59 missile in the second half of the 1980s. After the advent of small-sized turbojet engines for long-range cruise missiles, and also due to the fact that the Kh-59 missile guidance system had a large range reserve, it was proposed to modernize the Kh-59 missile.

The missile is designed for high-precision destruction of important tactical objects covered by air defense.

Serial production of Kh-59M missiles was mastered and is carried out by the Smolensk Aviation Plant.



The Kh-59 "Ovod", Kh-59ME "Ovod-ME" and Kh-59MK missiles in the museum on the territory of the "Raduga" design bureau. The destabilizers of the first two missiles are deployed in flight configuration ( <http://airmuseum.ru/> ).

Author: [DIMMI](#)

Created: 03.04.2016 13:59:20

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## Prospective long-range cruise missile Kh-BD (project)

DATA FOR 2023 (requires updating)

Prospective long-range cruise missile Kh-BD (project)

★★★

Project of a promising long-range cruise missile. The development of the cruise missile is being carried out by GosMKB Raduga as of 2016. On 23.02.2017, the scientific director of GosNIIAS Evgeny Fedorov said in an interview that the project of the modernized Tu-160M (Tu-160M2) aircraft includes a promising long-range cruise missile. Probably, as of 2017, work is underway to formulate requirements and determine the appearance of the new missile. The flight range of the new missile will significantly exceed 3,000 km - the flight range of the Kh-101 ( [source](#) ).

According to Fedosov: "Today, a concept has emerged: not to introduce long-range aircraft into the enemy's air defense zone. It (the carrier aircraft) must operate outside this zone, and the weapons enter the zone. If such an aircraft carries a lot of weapons, then the principle of information degradation of the enemy's air defense begins to work again. Without entering the enemy's air defense zone, but launching a missile there, we dictate the direction of the strike, the moment and the density. And if you reconnoiter the enemy's air defense well, then we will always find a bottleneck and throw a group into this throat. If we are talking about a strategic nuclear strike, then at least one missile will always pass. And that will be enough" ( [source](#) ).

On September 16, 2023, during the demonstration of Russian Aerospace Forces aircraft to the leader of the DPRK Kim Jong-un, a Tu-160 "Vladimir Sudets" aircraft with missiles was demonstrated - with the commentary it was stated: " Two cassettes of six missiles. Carries the Kh-BD missile with a range of over 6.5 thousand kilometers." From which we can conclude that the Kh-BD missile has been adopted by the Russian Aerospace Forces as of September 2023.



Missiles under the Tu-160 "Vladimir Sudets" carrier shown on 09/16/2023 (photo - RIA Novosti)

Author: DIMMI

Created: 24.02.2017 08:53:46

Comments: 1

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## X-31 - AS-17 KRYPTON

DATA FOR 2023 (in progress)

X-31P / product 77P - AS-17C KRYPTON

X-31PD / product 77PD - AS-17D KRYPTON X-31A / product 77A - AS-17A KRYPTON X-31AD / product 77AD - AS-17B KRYPTON Target MA-31

★★★

Anti-ship and anti-radar missiles. The missile was developed by the Zvezda Design Bureau (now the Zvezda-Strela State Research and Production Association, Chief Designer G.I. Khokhlov) as a replacement for the Kh-27PS anti-radar missile, which did not meet the requirements of the USSR Air Force for launch range and the ability to counter the missile of enemy air defense missile systems (the Kh-27PS lost its target when the air defense missile system radar was turned off). The development of the anti-radar missile began in 1975 under the supervision of V. Bugaisky. The



missile was intended to destroy the Improved Hawk and Nike Hercules air defense missile systems. Due to its high flight speed (750 m/s when launched at a range of 25 km from a low altitude), in the case of the Improved Hawk air defense missile system, the missile was supposed to hit the target before the anti-aircraft missiles could hit the carrier aircraft. When working against the Nike Hercules air defense missile system, it was supposed to operate without entering the air defense missile system's kill zone. To achieve high speed, it was decided to use a ramjet for launching which a solid propellant rocket booster placed in the nozzle of the cruise engine would be used. The maximum launch range was supposed to be 60 km and the missile weight - no more than 400 kg. When creating the missile, it was planned to arm it with attack aircraft such as the MiG-27, Su-17M and Su-24, each of which was to have at least two missiles.

It turned out to be impossible to create a missile with a ramjet engine with a weight limit of 400 kg, and a larger medium-range missile was developed with the ability to destroy the promising SAM-D ("Patriot") air defense missile system, as well as surveillance radars operating in the B and C frequency ranges. For an expanded range of targets, the Omsk NPO "Avtomatika" was given the task of designing three seeker heads (PRGS-4VP, PRGS-5VP and PRGS-6VP) operating in these ranges.

In 1978, the USSR Council of Ministers issued a Resolution on the development of an anti-ship version of the Kh-31 missile, called the Kh-31A. The anti-ship missile was designed to destroy surface ships with a displacement of up to 4,500 tons. The missile was equipped with an active radar homing head and a penetrating warhead instead of a high-explosive fragmentation warhead. The draft design was approved in 1979.

Factory flight tests of the Kh-31 missiles began in May 1982 from the MiG-27M carrier aircraft. The Pr1 and Pr2 versions of the missiles were tested, as well as full-size mock-ups of the Kh-31 missile to test the emergency release. The Kh-31Pr1 missile was equipped with a launch solid-propellant rocket motor and a mock-up of a ramjet - the release, launch of the launch solid-propellant rocket motor and flight on the launch section were tested. The Kh-31Pr2 missile was equipped with a working launch solid-propellant rocket motor and a sustainer ramjet - the missile launch, launch and sustainer flight, and stabilization of the missile on these flight sections were tested with the missile.



Anti-radar missile Kh-31PD (photomontage, <https://ktrv.ru/>).

Author: [DIMMI](#)

Created: 15.02.2023 15:17:09

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## X-15 / RKV-15 - AS-16 KICKBACK

**DATA FOR 2022 (standard update)**

**X-15 / RKV-15 / product 115 / 9A2001 - AS-16 KICKBACK**

**X-15S**



Tactical strike aeroballistic guided missile. The development of the missile, similar in principle to the SRAM missile (USA), was conducted by the Raduga Design Bureau since 1974 ( [source](#) ) under the general supervision of Chief Designer I.S. Seleznev.

In 1978, prototypes of the missile were manufactured and serial production of the missile was launched at the Dubna Machine-Building Plant. In 1986, the missiles began to arrive in Long-Range Aviation units. Due to the delay in the refinement, only a few dozen of the last serial Tu-22M3s were equipped with the missile complex. Modification of previously produced aircraft was not carried out. The refinement of the complex also delayed the development of the missiles by combat crews - only in December 1988, the first launches were carried out by pilots of the 200th TBAP.

The missile was accepted into service in 1988 and was supplied to the 184th Guards Heavy Bomber Aviation Regiment and the 1230th (now the 121st Guards) Heavy Bomber Aviation Regiment on Tu-160 aircraft, as well as to three regiments of the 37th Air Army of the Supreme Command on Tu-22M3 aircraft. The missile was first publicly shown in March 1992 at a demonstration of equipment for the heads of the CIS countries in Machulishchi (Belarus).

The purpose of the basic model of the Kh-15 missile is to destroy stationary area targets - military-industrial facilities, Air Force and Air Defense bases, radar stations, command posts, etc. Including for creating a gap in the enemy's air defense system.

Missile X-15S ( <http://militaryphotos.net> ).Author: [DIMMI](#)

Created: 13.02.2009 00:54:01

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## NIR Echo

DATA FOR 2019 (in progress)

Research and development project "Echo"



Research and development work on defining the appearance of promising strategic air attack weapons. The work was conducted from 1968 to 1970 by Research Institute-2 (GosNIIAS). The research involved comparing supersonic cruise, subsonic cruise and air-to-ground ballistic missiles with the aim of defining the appearance of promising strategic missiles of a similar type for arming the long-range aviation of the USSR Air Force. The research project also worked out the appearance of a promising airborne anti-radar strike complex ( *history - Markovsky* ).

One of the proposals developed within the framework of the research project "Echo" was the idea of "counter detonation" of a cruise missile warhead when it is hit by anti-aircraft or airborne interception systems. It was believed that during a massive attack over the territory of a potential enemy, such an impact on air defense / AWACS, as well as the general defeat of the enemy's territory, would be great. According to E.A. Fedosov, it was the "touch-me-not missile factor" that opened the way to the development of such weapons systems in the USSR.

As a result of the research, it was established that the use of relatively inexpensive long-range subsonic cruise missiles with nuclear warheads, due to stealth and increased accuracy, in the conditions of the air defense system of a potential enemy can be very effective. The enemy's air defense system could be overcome due to the massive use of cruise missiles with flight echeloning in time. The stealth of such cruise missiles could be achieved due to their size, design features, as well as due to low-altitude flight with terrain following. In 1971, relying, among other things, on the results of the Echo research, the Raduga Design Bureau came up with an initiative to create such a missile, but mainly citing the low performance characteristics of the proposed missile, the USSR Ministry of Defense refused to create such a missile.

After the intensification of work on the ALCM air-launched cruise missile system in the USA in 1975, the leadership of the USSR Ministry of Defense decided to create a similar missile system. The USSR Council of Ministers Resolution on the creation of air-launched (Kh-55, MKB Raduga), sea-launched and land-launched cruise missile systems was adopted on December 8, 1976.

Author: [DIMMI](#)

Created: 21.04.2019 13:57:23

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## KTRV/GZUR hypersonic missile (project)

DATA FOR 2020 (standard update)

KTRV/GZUR hypersonic missile (project)



Hypersonic cruise missile / hypersonic guided missile (GZUR) project. Research and development work on the hypersonic cruise missile was started by the Dubna division (former MKB Raduga) of the Tactical Missile Weapons Corporation as of August 2011. The General Designer and General Director of the Tactical Missile Weapons Corporation (TRV) is Boris Obnosov. By December 2017, [the source](#) spoke of a joint development by the Dubna MKB Raduga and the head office of KTRV in Korolev.

It is possible that the results of tests on the topic of R&D "Kholod-2" and the experience of creating the experimental hypersonic vehicle "Igla" (Baranov Central Institute of Aviation Motors) will be used in the creation of the new missile.

On 23.04.2013, the media reported that by the beginning of summer 2013, a target program for the creation of hypersonic weapons by the TRV corporation would be developed: "A permanent working group has been formed on the basis of the corporation, within which there are 10 subgroups in various areas." In the summer of 2013, it is planned to defend the program at the Military-Industrial Complex under the Government of Russia ( [source](#) ).

On 28 August 2013, Russian media [reported](#) that "a hypersonic missile has been created by the TRV corporation, but so far it has only flown for a few seconds" - this was a free paraphrase of B. Obnosov's statement at the MAKS-2013 air show that missiles had already been created in Russia that could fly at a speed of 4.5M for a few seconds (apparently referring to the tests of [the Kh-90](#) and Kholod missiles in the 1980s and 1990s).



The name "GZUR" was first mentioned on 22.12.2017 in [a source](#) - here information is also provided that the missile is probably undergoing testing and from 2020 it is planned to begin serial production of the missile at a rate of up to 50 units per year.

Author: [DIMMI](#)

Created: 19.08.2011 14:53:28

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## K-22 complex, X-22 missile - AS-4 KITCHEN

**DATA FOR 2020 (in progress)**

**Complex K-22 "Burya" / D-2, missile Kh-22 - AS-4 KITCHEN**

**Complex K-22M / D-2M, missile Kh-22M - AS-4 KITCHEN**



Aircraft missile system with a cruise missile (anti-ship, area-attack and later anti-radar). Development of the K-22 system with the "105" carrier aircraft (future Tu-22) was started by the Dubna branch of OKB-155 (since 30.04.1966 MKB "Raduga") according to the Resolution of the USSR Council of Ministers No. 426-201 of 17 June 1958. Chief Designer - A. Ya. Berezhnyak.

Initially, the system was developed with two versions of cruise missiles: with a missile for hitting high-contrast point (including moving) targets, as well as with a missile for hitting area targets with pre-known coordinates. The development of the control and guidance system for the K-22U complex was carried out by KB-1 of the USSR State Committee for Radio Electronics (chief designer V.M. Shabanov, deputies P.G. Terezovsky and P.S. Karzhavin) in three versions:

- with an autonomous inertial path counter PSI
- with active radar homing head
- with a passive radar homing head. The passive homing head had to be aimed at a wide range of shipborne radio-technical devices - radars, communications and navigation equipment.

By the Decree of the Council of Ministers of the USSR dated July 21, 1959, OKB-155 was ordered to build 2 Kh-22 missiles for testing in the 4th quarter of 1959 and 3 missiles in the 1st quarter of 1960, and also to present the entire complex for joint tests with the Air Force in the 1st quarter of 1961.

The first samples of missiles for testing were manufactured in 1962 by Plant No. 256 of the State Aviation Committee. Testing of the missiles began in the same 1962 from a specially converted Tu-16K-22 carrier aircraft. Testing of the Kh-22 missiles encountered many difficulties and was delayed. State tests of the K-22 complex with the Kh-22 missile with an active radar homing head and a standard Tu-22K carrier with a PN radar were completed only in 1967. In the same 1967, the K-22 complex with the Tu-22K carrier aircraft was accepted into service with the Long-Range Aviation of the USSR Air Force. Serial production of Kh-22 missiles was launched at Plant No. 256 (renamed the Dolgoprudny Machine-Building Plant in 1966). Later, missile production was also carried out at the Ulyanovsk Machine-Building Plant and at other plants.

The creation and testing of the Kh-22PSI missile with the PSI inertial guidance system dragged on and the missile was accepted into service only in 1971.

In 1971, a group of specialists from the Raduga Design Bureau headed by A. Ya. Berezhnyak was awarded the USSR State Prize for the creation of the Kh-22 missile.

A separate Resolution of the USSR Council of Ministers was adopted in 1962 on the development of an anti-radar version of the missile, but work on creating this version of the Kh-22 missile proceeded with great difficulty and was completed later.



Suspension of the Kh-22 missile under the Tu-22KD ( Yakubovich N., Supersonic bomber Tu-22. Issue 16 "Armada". Moscow, Eksprint, 1999)

Author: [DIMMI](#)

Created: 17.02.2009 00:19:02

Comments: [11](#)[READ THE FULL ARTICLE >](#)

## X-59MK2 - AS-22

**DATA FOR 2018 (in progress)**

**Missile X-59MK2 - AS-22**



Air-launched cruise missile. The development of the missile was started by the Raduga Design Bureau (now part of the KTRV concern) presumably in the early 2010s on the basis of the Kh-59MK missile. The missile is designed to hit targets with pre-determined coordinates and is an analogue of the AGM-158 JASSM, Scalp EG/Storm Shadow and Taurus missiles ([source](#)). The missile design takes into account the requirements for reducing radar visibility, as well as ensuring the use of a missile with a suspension in the internal compartments of carrier aircraft.

In February 2018, during military tests of the Kh-59MK2 missiles, combat launches of missiles were successfully carried out in Syria from Su-57 carrier aircraft - this was announced on May 25, 2018 at the board meeting of the Ministry of Defense by Russian Defense Minister S.K. Shoigu.



Model of the Kh-59MK2 missile at the MAKS-2015 air show (photo by Said Aminov, <https://saidpvo.livejournal.com>).

Author: [DIMMI](#)

Created: 03.06.2018 14:50:00

Comments: [4](#)

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## X-59 Gadfly - AS-13 KINGBOLT

DATA FOR 2016 (standard update)

X-59 "Gadfly" / product "D-9" - AS-13 KINGBOLT

★★★

Heavy tactical guided missile. The missile was developed by the Raduga Design Bureau starting in 1980 (some [sources](#) say since 1973). The missile was developed using the technological reserve of the Kh-29T television guidance missile and using some solutions tested on the Kh-58 missile. The television guidance system imposed its own limitations on the missile's flight speed, related to the response speed of the guidance operator. The missile was intended for high-precision destruction of important tactical targets covered by air defense.

In 1982, tests of the Su-17M4-59 complex with the Su-17M4 carrier aircraft, the Kh-59 missile and the APK-9 hardware container began. This missile armament system had already been tested on the Su-24 bomber, but was not completed due to control defects. The Su-17M4 (No. 16-09) received from the Ministry of Defense was modified very quickly, within a little over a month, and by the end of October 1982 it was taken out for testing. The Kh-59 missile was suspended on the right under-fuselage unit using the AKU-58 ejection device, the container with the control equipment was located nearby on the left point. The test flight of the aircraft was carried out by the OKB test pilot A.A. Ivanov on November 1, 1982. As part of the factory testing stage, 86 flights and seven practical missile launches were performed during 1982-1983. Testing of the Kh-59 on the Su-17M4 began on September 28, 1983. Then followed special flight tests at the Air Force State Research Institute, according to the program of which another 64 flights and nine launches were carried out, although only 39 flights were recognized as qualifying. The flights were performed by the OKB pilot I.V. Votintsev, from the Air Force State Research Institute V.A. Oleynikov, Yu.V. Zhukov and V.I. Mostovoy ( *history - Markovsky* ) flew.

Notable successes were achieved during some firings: hits on the target shield were achieved with an accuracy of one and a half meters from the "cross", however, the Kh-59 could only be used during the day, with good visibility and target contrast (otherwise it was impossible to really see it on the screen, let alone carry out targeting). The provided autonomous control for entering the target area with its subsequent search turned out to be not very reliable, inferior to the manual mode along the entire flight route with the missile being launched onto the target. During the tests, the best results were achieved with targeting using noticeable linear landmarks, such as a river, railroad or highway leading to the target, otherwise its detection was problematic. There was a case when, during the next stage of testing on the Su-24M, the shooting test was in question - the target was impossible to find in the hopelessly flat expanses of the steppe near Akhtubinsk. Having shown ingenuity, the test team borrowed a tractor from a neighboring collective farm, ploughing a strip several kilometers long in the direction of the target. The dug up black earth, stretching towards the target, looked like a contrasting clear line on the targeting screen and became a reliable "pointing finger", allowing the problem to be solved ( *source - Markovsky* ).

Tests of the Kh-59 missiles with the Su-17M4 carrier aircraft were successfully completed by 1984 ( [source](#) ) and the missile was recommended for equipping fighter-bombers of the USSR Air Force. The use of the Kh-59 missile on the Su-17M4, being a very large product of more than five meters in length, the missile placed on the fuselage units almost touched the ground. Tests of this missile system showed its prospects, but this version of the weapon was not transferred to the Su-17M4 for serial production. A positive decision was hindered by the low reliability of the system, which suffered from many defects. The Ministry of Defense was in favor of introducing the Kh-59, but with the condition of further increasing the range. The design bureau began working on the documentation for laying in the series, however, in the end, they decided to limit themselves to using the missile on the Su-24M bomber, where the functions of the guidance operator were performed by the navigator ( *source - Markovsky* ).

In 1984, the developers were awarded the USSR State Prize for the creation of the "high-precision aviation complex Kh-59". The Kh-59 missile was probably adopted by the USSR Air Force in 1984-1985. Serial production of the missile was carried out at the Smolensk Aviation Plant.





Guided missile X-59 - AS-13 KINGBOLT ( <http://www.modellmix.su> ).

Author: [DIMMI](#)

Created: 01.04.2016 21:42:14

Comments: 2

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### BrahMos complex, SK310 / PJ-10 missile

**DATA FOR 2018 (standard update)**

**BrahMos complex / BrahMos, SK310 missile / BrahMos PJ-10**

**ROC "Alliance"**

**BrahMos block I missile**

**BrahMos block II missile**

**BrahMos block III**

**missile SK-310A / BrahMos-A missile (aircraft)**

★★★★

Anti-ship cruise missile / cruise missile for firing at ground targets. Analogue of the domestic cruise missile "Yakhont" / "Onyx" developed by NPO "Mashinostroyeniye" (OKB-52 V.N.Chelomey) produced and developed for various platforms by the joint Russian-Indian enterprise "BrahMos Aerospace Pvt. Ltd." (established on 12.02.1998). In 1999, work on the complex began in related design bureaus (for example, NPO "Iskra"). The missile model was first shown at the MAKS-2001 air show. Testing of BrahMos missiles began no later than 2001, and their joint serial production began in January 2004. The sea-based BrahMos missile in the anti-ship cruise missile version (for surface ships) was accepted into service with the Indian Navy in 2006. The delivery of land-based missile systems to Indian coastal defense units began in 2007.

It is planned to accept into service different versions of the missiles (by basing) - land-based (wheeled transporter with vertical launch container, accepted into service), air-based version (carriers - Su-30MKI and other aircraft of the Indian Air Force), a complex for ships (accepted into service) and submarines of the Indian Navy. The Indian side is engaged in the creation of the control system of the complex. Some components for the BrahMos missiles are produced by NPO Strela (Orenburg, missile production). The possibilities of joint production as of 2009 are estimated at 200 anti-ship cruise missiles per year (2005-2006 - 100 units per year). The complex is offered for export. Many characteristics are identical to those of the Yakhont/Onyx anti-ship missiles.



Launch of the BrahMos block III missile at the Pokharan test site in Rajasthan, 18.11.2013 (photo - Indian Ministry of Defense via <http://ria.ru> ).

Author: [DIMMI](#)

Created: 05.09.2010 01:54:01

Comments: [61](#)

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## X-45 Lightning

### DATA FOR 2018 (standard update)

The **Kh-45 Molniya missile** is a long-range air-launched anti-ship missile. The design of the Kh-45 missile using the developments of the **Kh-33** missile , which was created by the P.O. Sukhoi Design Bureau to arm the **I-4** carrier aircraft , began in 1968 ( *source - Exposition* ) at OKB-155 (MKB Raduga), where work on the Kh-45 was headed by A.Ya. Berezhnyak, G.K. Samokhvalov and V.A. Larionov (chief designer). In January 1970, a preliminary design for



the missile was presented to the customer. The missile was intended to destroy aircraft carriers as part of an aircraft carrier strike group or a formation of individual ships, as well as to destroy ground-based radio-contrast targets. In 1964, it was planned to deploy the Kh-33 missile production at Plant No. 51 named after Lavochkin, but in 1965, by decision of the Military-Industrial Complex, it was ordered to prepare serial production of the missile by the enterprises of the USSR Ministry of Aviation Industry under the leadership of Plant No. 51. According to the project of the Kh-45 missile, the Raduga Design Bureau, even before the design was completed - in 1969 - began to transfer documentation to the Dubna Machine-Building Plant. An experimental series of missiles was in production. According to some [sources](#), missile tests were started, but were not completed. The development of the project was terminated in 1975 ( [source](#) - *Exposure* ). By default, the data of the Kh-45 missile.

★★★



Model of the X-45 missile in the open part of the exposition of the Raduga Design Bureau Museum, photo from the exposition in the Dubna Museum of Archeology and Local History (10/21/2017, flateric).

Author: [DIMMI](#)

Created: 14.02.2013 17:40:39

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## X-50 / product 715 / 9-A-5015

**DATA FOR 2017 (in progress)**

**Missile Kh-50 / Kh-SD / "product 715" / 9-A-5015**

★★★

Medium-range air-launched cruise missile (presumably). Development of the missile was started by MKB Raduga (now part of the KTRV concern) in the early 1990s ( [source](#) ). It is believed that the missile is similar in capabilities to the AGM-158 JASSM missile ( [source](#) ).

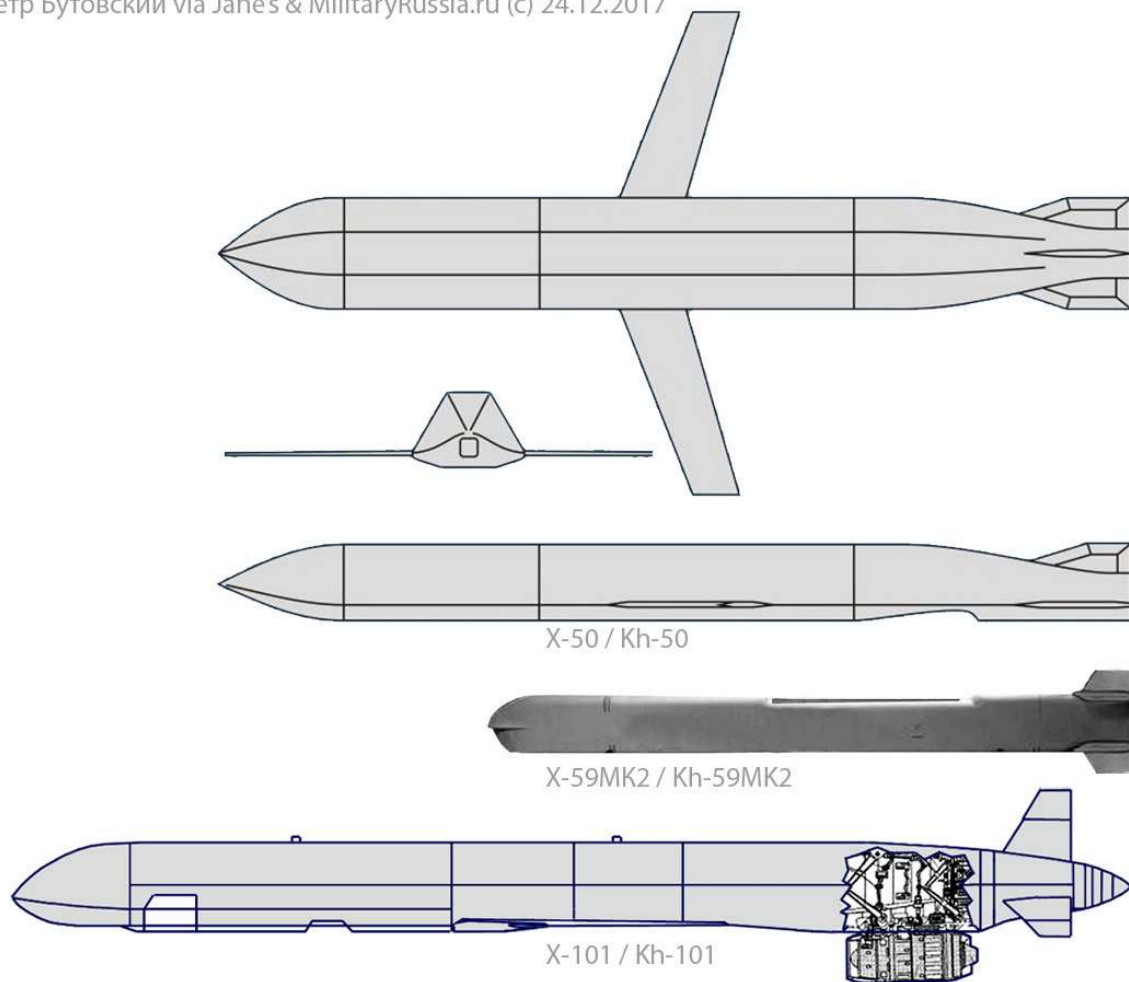
On December 24, 2014, PJSC Tupolev and GosMKB Raduga signed contract No. 1418187327032010104000204/450/4503M/SChOKR/2014 for the implementation of R&D work "45.03M-715" ( [source](#) ). Probably, the R&D work involves a set of works to ensure the use of the "article 715" missile developed by GosMKB Raduga from the Tu-22M3M/"45.03M" carrier aircraft. Completion of the R&D work is expected in the fall of 2018.

Static and ground tests of the "product 715" missile were apparently conducted in 2016 ( [source](#) , [source](#) ).

According to Western data, serial production of the missile is planned to be launched within the framework of the state armament program for 2018-2027 ( [source](#) ).

The name "Kh-50" in conjunction with the name "Kh-SD" was first published on 22.12.2017 ( [source](#) ).

Пётр Бутовский via Jane's &amp; MilitaryRussia.ru (c) 24.12.2017



A diagram of the new Russian Kh-50 air-launched cruise missile, based on a patent from JSC Tactical Missile Weapons Corporation (KTRV), with added images of the Kh-59MK2 and Kh-101 missiles (Pyotr Butovsky via Jane's and MilitaryRussia.ru, 12/24/2017).

Author: [DIMMI](#)

Created: 17.11.2017 07:04:20

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### X-35 / 3M24 - SS-N-25 SWITCHBLADE / AS-20 KAYAK

**DATA AS OF 2016 (standard replenishment)**

**Complex "Uran", missile Kh-35 / 3M24 / "article 78" - SS-N-25 SWITCHBLADE**

**Complex "Uran", missile Kh-35 / 3M24 / "article 78" - AS-20 KAYAK / AS-X-20 Harpoonski**

★★

Anti-ship cruise missile. Preliminary development of the small-sized anti-ship missile project was conducted by Zvezda Design Bureau starting in 1977. The decision to create a missile for the Uran ship-based missile system was made by the Resolution of the CPSU Central Committee on March 16, 1983, after studying the experience of using the Exocet anti-ship missile during the Anglo-Argentine conflict (May 1982). The development was carried out by Zvezda Design Bureau (former OKB-455, now part of KTRV), General Designer - V.N. Bugaisky (later - V.G. Galushko). Chief Designer of the system - Georgy Ivanovich Khokhlov. Chief Designer of the direction (as of 2015) - Nikolay Anatolyevich Vasiliev ([source](#)). The first version of the missile's preliminary design was reviewed in 1983 and was sent back for revision due to non-compliance with the requirements for the radar homing head characteristics ([source](#)). According to sources, another Resolution on the development of the complex was adopted by the USSR Council of Ministers on April 16, 1984 ([source](#)).

**Tests** . The first launch from a ground-based launch pad was planned for November 4, 1985, but due to an automatic failure (incorrect information was given about the opening of the TPK covers), the launch did not take place. The first successful launch was carried out (on the second attempt on this day) on November 5, 1985 at the test site of the 31st Test Center of the USSR Ministry of Defense (Feodosia, Crimea). According to the launch program, the missile was supposed to fly 40 km. The missile successfully exited the TPK, flew about 50 meters and fell into the sea ([source](#)). This launch is considered the first launch in the flight design testing program of the Kh-35 anti-ship missile.

The first public demonstration of the missile took place at the Mosaeroshow-1992 exhibition.

The Kh-35 missile is designed to destroy missile, torpedo, artillery boats, surface ships with a displacement of up to 5,000 tons and sea transports.





The Kh-35E missile without a booster engine at one of the naval exhibitions in St. Petersburg, 2000s ( <http://army.lv/> ).

Author: [DIMMI](#)

Created: 02.02.2016 13:28:30

Comments: [2](#)

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## X-66 / X-23 - AS-7 KERRY

**DATA AS OF 1997 (requires updating)**

**X-66 product 66 "Thunder" - AS-7 KERRY**

**X-23 product 68**

**X-23M product 69**

**X-23L**

★★★

Tactical air-to-ground guided missile. Developed and manufactured by the Design Bureau of Plant No. 455 (now JSC KTRV, formerly GNPO Zvezda-Strela, Korolev, Moscow Region). Chief Designer Yu. N. Korolev. The result of placing a state defense order for the development of the Kh-66 missile at Plant No. 455 was the issuance of Order No. 100 of the USSR Ministry of Aviation Industry on March 12, 1966, on the establishment of an experimental design bureau at the enterprise.

In the early 1960s, after arming the MiG-21PFM aircraft with RS-2US missiles, experimental firings of the missiles at ground targets were conducted. In 1963, based on the test results, an act was signed which concluded that it was possible to use RS-2US missiles against ground targets, indicating that such use was inappropriate. In 1965, a decision was made to develop a tactical air-to-ground missile using the RS-2US missile power plant ( *ist.* - *Not an anniversary* ). On February 21, 1966, by order No. 36, a complex group was formed at Plant No. 455 to develop the Kh-66 missile. Yuri Nikolaevich Korolev was appointed chief designer of the development ( *ist.* - *They were the first* ).

Work on forming the appearance of the tactical missile was carried out by the design bureau of Plant No. 455 MAP on its own initiative. The conducted studies showed that with a warhead weight of 100 kg, ensuring the destruction of most small-sized ground and surface targets, the mass of the missile would be 270 kg. This value was comparable to the mass of the R-8M missile, serially produced by Plant No. 455, so the propulsion system was borrowed from it. The guidance equipment was taken from the RS-2US missile along with its last section. The receiving antenna of the equipment was located in the tail section of the missile, and the design bureau of Plant No. 81 MAP (now JSC "Iskra" Design Bureau named after I. I. Kartukov) was required to develop a two-nozzle apparatus for the engine. Preliminary development of this design at the KMZ Design Bureau was performed by V. V. Marchenko. The linear acceleration sensors, ampoule electric battery and cylinders for the pneumatic unit were the same as on the RS-2US missile. The control units of the RS-2US missile were modernized in order to increase their power ( *source* - *Not an anniversary* ).

The Kh-66 missile was accepted into service by Order of the USSR Minister of Defense No. 0075 dated June 20, 1968. The Kh-23 missile was already in service by 1975, the Kh-23M - until 1988. They are used with the APU-68 (for example, on the Yak-38).



Missile of the Kh-23/Kh-23M family - AS-7 KERRY for the Su-17M3 of the USSR Air Force (Flieger Kalender 1985. 1984, GDR).

Author: [DIMMI](#)

Created: 19.02.2009 00:19:04

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## BrahMos-II / BrahMos-II (project)

## DATA AS OF 2015 (standard replenishment)

## BrahMos-II / BrahMos-2 missile



Hypersonic missile project. The missile is being developed by NPO Mashinostroyenia ( *source - Annual report, p. 15* ) jointly with DRDO (India). On September 29, 2008, after a meeting of the Russian-Indian Commission on Military-Technical Cooperation, the head of the BrahMos joint venture, Dr. Shivathanu Pillai, said that a decision had been made at the meeting to jointly develop the BrahMos-II hypersonic missile with a flight speed of 5-7M. The missile was planned to be created within 5 years (in 2013). In 2009, DRDO planned to test the HSTDV hypersonic demonstrator vehicle, which was being developed jointly with IAI (Israel), TsAGI and TsiAM. The purpose of the tests was to test the combustion chamber of the hypersonic ramjet.

There is an assumption that the joint development is based on a system created primarily for the Russian Armed Forces at NPO Mashinostroyenia - a missile system with the Zircon anti-ship missile . The first statements about the development of the system in the media date back to 2010-2011. As of early 2013, it is believed that the identification of the BrahMos-II system as an analogue of the Zircon anti-ship missile is either a hoax or simply a mistake. As of 2011, the organization of serial production of the Zircon missile system (and possibly Brahmos-II) is planned for the coming years at PO Strela (Orenburg, *source - Annual report, p. 15* ).

Before the opening of the Aero India 2013 aviation exhibition on February 5, 2013, a photo of the BrahMos-II missile model appeared for the first time. Later, on the opening day of the exhibition on February 6, more detailed photos of the missile model appeared.

*The data are presumptive. Sources are given.*



Model of the BrahMos-II missile at the DefExpo-2014 exhibition, 05.02.2014 ( <http://www.brahmand.com/> ).

Author: DIMMI

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